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(54) APPARATUS FOR PERCOLATING COFFEE

(71) I, ISAMU SAITO, of Japanese nationality, of 201, 3—12, 1—chome, Akabanedai, Kita-ku, Tokyo, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

The invention relates to apparatus for percolating coffee.

In conventional syphon-type percolators in general use, there have been some deficiencies in the shape and construction of the mixing vessel, the connection between the mixing vessel and the hot water flask, and the manner of supporting the filtering element in the apparatus. These deficiencies have manifested themselves in the preparation of muddy-coloured coffee containing a lye which spoils the flavour of the coffee.

Thus, where the filtering element is supported by spring-loading means, as in conventional coffee percolators, the spring-loading means are subject to irregular, abruptly applied forces caused by sudden pressure rises in steam as a result of overheating. The spring-loading means are thereby vibrated to such an extent that the filter element is displaced and allows coffee grounds to fall from the mixing vessel into the hot water flask. Moreover, the high pressure steam tends to impinge on the central part of the filter element and this increases the tendency of the filter element to be displaced.

Another disadvantage in the operation of conventional coffee percolators is that as water is transferred from the hot water flask, as a result of steam pressure in the flask above the water level in the flask, the remaining water is heated more and more rapidly and the level of the water in the flask falls at an increasing rate. If the water level falls below the bottom of the spout of the mixing vessel, there is a sudden flow of steam from the flask into the mixing vessel, and this flow of steam has a very disturbing effect on the filter element. As the flasks for coffee percolators are normally made of glass, they vary appreciably in size. It is therefore not possible to predict what volume of water has to be transferred to the mixing vessel before the level of the water in the flask drops below the lower end of the spout so as to allow steam to discharge directly into the mixing vessel. This means that the percolator may be operated using either too much or too little water in the flask. If too much water is used, this spoils the flavour of the coffee, but if too little water is used the flask is liable to break.

It is an object of the invention to provide a coffee percolator in which these disadvantages are reduced.

According to the invention, there is provided apparatus for percolating coffee comprising a flask, a mixing vessel having a necked-down lower end, the lower end being sealingly mounted in the mouth of the flask, a sleeve-shaped joint member seating in the lower end of the mixing vessel and having a first pressure dispersing plate provided with a plurality of randomly spaced holes, a funnel-shaped joint member having its upper end in screw-threaded engagement with the lower end of the sleeve-shaped joint member, a spout extending from the funnel-shaped joint member towards the bottom of the flask to provide a fluid passage between the flask and the mixing vessel, and a frame in screw-threaded engagement with the lower end of the sleeve-shaped joint member and having a second pressure dispersing plate provided with a plurality of randomly spaced holes, the arrangement being such that the second pressure dispersing plate is located below the first pressure dispersing plate and that when the frame is screwed into the sleeve-shaped joint member a filter paper may be held between the two pressure dispersing plates.

One construction according to the

invention is hereinafter described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a sectional elevation of the main components of a syphon-type coffee percolator according to the invention;

Figure 2 is a sectional elevation of a sleeve-shaped joint member carrying an upper pressure dispersing plate and forming part of the assembly shown in Figure 1;

Figure 3 is a sectional elevation of a frame carrying a lower pressure dispersing plate;

Figure 4 is a sectional elevation of a funnel-shaped joint member which is co-operable with the sleeve-shaped joint member to support the frame carrying the lower pressure dispersing plate, and part of a screw-threaded spout for a mixing vessel forming part of the assembly shown in Figure 1;

Figure 5 is a bottom view of the frame shown in Figure 3;

Figure 6 is a part-sectional elevation of a stand for supporting the components of the percolator shown in Figure 1;

Figure 7 is a plan view of a pedestal forming part of the stand shown in Figure 6; and

Figure 8 is a plan view of a flask supporting bracket forming part of the stand shown in Figure 6.

As shown in Figure 1, the coffee percolator comprises a spheroidal glass flask 1 for mounting in a flask supporting stand shown in Figures 6 to 8. A glass mixing vessel 3 is fitted with a lid 11 and formed with a necked-down lower end 3*a* which is fitted with a rubber sealing band 5 which is pressed into the mouth 1*a* of the flask 1 to form an airtight and liquid-tight joint. A sleeve-shaped joint member 6 (Figure 2) is formed with a flared upper end which fits neatly within the necked-down lower end 3*a* of the mixing vessel 3 and, at its lower end, is formed with an external screw-thread 6*a* which engages with an internal screw-thread 2*a* at the upper end of a funnel-shaped joint member 2 (Figure 4) which supports a spout 4 of synthetic resin material such as polypropylene or polycarbonate, for the mixing vessel 3. The member 6 also has an internal screw-thread 6*b* which engages with an external thread 9*c* of a frame 9 (Figure 3). The member 6 and the frame 9 are integrally formed with pressure dispersing plates 16 and 7 respectively, having randomly spaced apertures.

In operation, water heated in the flask 1 evaporates until the vapour pressure in the space above the water level in the flask rises sufficiently to force water from the flask 1 up through the spout 4, through the apertures of the pressure dispersing plates 7 and 16 and into the mixing vessel 3. One or more layers of a filter paper 8 are held between the plates 7 and 16 and carry a layer of coffee grounds so that as the heated water passes from the flask 1 to the mixing vessel 3, it passes through the filter paper 8 and the layer of coffee grounds, carrying the most finely ground particles of the coffee grounds upwards where they are thoroughly mixed with the water. After mixing, undissolved particles of the coffee grounds gradually settle back on the filter paper 8.

When mixing has been completed to the extent required, heating of the water in the flask 1 is discontinued and the water is allowed to cool. As a result, the vapour pressure in the space above the water level in the flask falls so as to allow coffee percolated in the mixing vessel to flow back through the layer of coffee grounds on the filter paper 8 and into the flask 1, through the spout 4.

As shown in Figure 1, the lower end of the spout 4 is formed in its cylindrical surface with a plurality of holes 10. These holes 10 allow any sudden increase in pressure within the spout 4, as a result of the formation of gaseous bubbles of water vapour and air, to be substantially dissipated within the water in the flask 1 so as to limit the extent to which the flow of water up through the spout 4 is accelerated. Moreover, because of the pressure dispersing plate 7 disposed below the filter paper 8, the flow of water from the flask 1 impinges substantially uniformly across the whole area of the filter paper 8. Thus, by means of these two expedients, it is ensured that any tendency for the filter paper to suffer vibration and to be disarranged by water and steam flowing upwards through the spout 4 is minimised. This ensures that the coffee grounds supported by the filter paper 8 are prevented from falling into the flask 1 or flowing back into the flask 1 when the temperature of the water in the flask 1 falls, to cause muddying of the coffee flowing into the flask 1. The coffee therefore remains transparent and free from imperfections in flavour resulting from the presence of undissolved coffee grounds.

With a percolator of this construction, the filter paper 8 is held between the two pressure dispersing plates 7 and 16 and so is securely held and is unlikely to rupture or suffer any other damage or displacement. Moreover, as a result of the provision of two pressure dispersing plates, steam pressure can be dispersed very effectively, with consequent improvement in the performance of the percolator.

In addition, since the spout 4 has an external screw-thread 4*a* for engagement with an internal screw-thread 2*b* formed in the funnel-shaped joint member 2, when it is desired to make smaller quantities of coffee, the spout 4 may be lowered relative to the

funnel joint 2, merely by unscrewing the threaded connection between the spout 4 and the funnel joint 2. This lowers the bottom end of the spout 4 so as to ensure that direct flow of steam from the flask 1 to the mixing vessel 3 is deferred until the surface of the water in the flask 1 falls to a lower level than when larger quantities of water are used.

As shown in Figure 6, the flask supporting bracket 12 is mounted on a stand having a "U"-shaped pedestal 41 (Figure 7), a column 43 formed with a corrugated hand grip 43*a*, a bracket body 44 having a lateral projection 45 to which the ring-shaped bracket 12 is attached by means of screw-threaded fastening elements 48, and a nut 49 which is engageable with a fastening screw 42 extending through aligned holes 41*b*m, 43*b* and 44*b* formed, respectively, in the pedestal 41, the column 43 and the bracket body 44, the head of the screw 43 seating in a hexagon shaped recess formed in the underside of the pedestal 41, to prevent rotation. Reinforcing projections 41*a* and 47, formed respectively on the pedestal 41 and the bracket body 44 seat in recesses formed at both ends of the column 43 so as to lock the components of the stand against relative rotary movement, and to provide improved support for vertical loading imposed by the weight of the flask 1 on the bracket 12.

This stand is very easily dismantled and re-erected, and provides a secure support for the other components of a coffee percolator constructed as described above.

As a result of the construction described above, it is possible to provide a coffee percolator having the following characteristics:—

1) In conventional coffee percolators, cloth has heretofore been used as a filter member in most cases, but in the coffee percolator of the present invention one or two layers of filter paper may be removably placed in the border portion between the mixing vessel 3 and the spout 4 so that the operation of the percolator can be effected in an easy, exact, and simple manner.

2) The filter paper 8 can be placed or removed simply and easily, and moreover, it has an excellent mounting.

3) The filter paper 8, used instead of a filter cloth can be disposed of in a very easy manner after use.

4) Since two pressure dispersing plates are provided, it is possible to reimpose steam pressure onto the filter paper after the pressure has been dispersed with no danger of breaking the filter paper, during the coffee percolating operation, or of vibrating the filter paper so as to cause a clearance between the filter paper and the inner circumferential wall of the passage between the mixing vessel 3 and the flask 1 so that no coffee grounds fall into the flask 1.

5) Since a plurality of holes is formed in the lower part of the spout 4, the irregular formation of large gaseous bubbles can be prevented so that no abrupt rise in steam pressure is transmitted from the flask. Thus, there is no danger of undue pressure being imparted to a part of the filter paper to vibrate it vigorously enough to cause coffee grounds to fall into the percolated coffee in the flask 1.

6) Since the lower end 3*a* of the mixing vessel is necked-down, a complete layer of coffee grounds can be formed even where small amounts are used so that only small amounts are needed to provide an effective layer sufficient for percolation.

7) Even if a flask 1 of non-standard size is used, it is possible to maintain a constant distance between the lower end of the spout 4 and the bottom of the flask 1 by moving the spout 4 up and down. This makes it possible to keep the amount of hot water remaining in the flask 1 at a constant level. Otherwise, if the amount of hot water remaining in the flask is too large, the same condition as the later addition of water to the percolated coffee will prevail and the flavour of the drink will be spoiled. Conversely, if the amount of hot water remaining is too small, there is a danger of breaking the flask.

8) Since the components of the percolator are not made of a metal, there is no fear of the deterioration of flavour of the coffee.

9) There is no need to adjust heating intensity and there is almost no danger of breaking the mixing vessel.

10) In the case of a conventional flask support stand, when installing the flask on the stand, it is difficult and time consuming to mount the flask vertically whilst the stand described with reference to Figures 6 to 8 is capable of supporting the flask vertically, immediately the stand is erected.

11) The percolator of the present invention can be used quite satisfactorily to percolate black tea or green tea because, as the filter paper is removably mounted in the percolator and is not difficult to mount as in conventional percolators, it is possible to easily replace the filter paper with a fresh one each time percolating has been completed so that the coffee percolator can be instantly utilized for percolating black tea or green tea simply by replacing the filter paper.

12) A coffee percolator constructed as described above can be used to enable anybody, even those unskilled in coffee percolation, to make a coffee drink of

consistent flavour and having good fragrance and transparency whenever coffee grounds are percolated.

WHAT I CLAIM IS:—

1. Apparatus for percolating coffee, comprising a flask, a mixing vessel having a necked-down lower end, the lower end being sealingly mounted in the mouth of the flask, a sleeve-shaped joint member seating in the lower end of the mixing vessel and having a first pressure dispersing plate provided with a plurality of randomly spaced holes, a funnel-shaped joint member having its upper end in screw-threaded engagement with the lower end of the sleeve-shaped joint member, a spout extending from the funnel-shaped joint member towards the bottom of the flask to provide a fluid passage between the flask and the mixing vessel, and a frame in screw-threaded engagement with the lower end of the sleeve-shaped joint member and having a second pressure dispersing plate provided with a plurality of randomly spaced holes, the arrangement being such that the second pressure dispersing plate is located below the first pressure dispersing plate and that when the frame is screwed into the sleeve-shaped joint member a filter paper may be held between the two pressure dispersing plates.

2. Apparatus according to claim 1, in which the spout is in the form of an open-ended cylinder, and the lower portion of the cylinder wall is provided with holes.

3. Apparatus according to claim 1 or claim 2, in which the spout is axially adjustable in the funnel-shaped joint member so that the distance between the lower end of the spout and the bottom of the flask may be varied.

4. Apparatus according to claim 3, in which the spout has a screw-threaded connection with the funnel-shaped joint member to permit the said distance to be varied.

5. Apparatus according to any preceding claim, in which the seal between the lower end of the mixing vessel and the mouth of the flask is provided by a rubber sealing band.

6. Apparatus according to any preceding claim, in which the sleeve-shaped joint member has an external thread for engagement with the funnel-shaped joint member and an internal thread for engagement with the frame.

7. Apparatus according to any one of claims 1 to 6, including a stand having a pedestal, a column and a bracket body connected by a bolt extending through aligned holes in the pedestal, column and bracket body and into engagement with a nut, the bracket body supporting a ring-shaped bracket for encircling the mouth of the flask.

8. Apparatus according to claim 7, in which the bracket body and the pedestal are both provided with reinforcing projections which engage in recesses formed at opposite ends of the column.

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1435554 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1

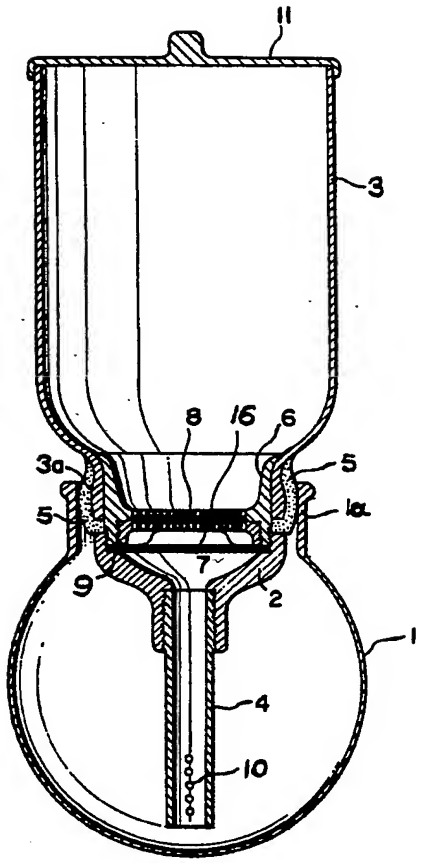


FIG. 2

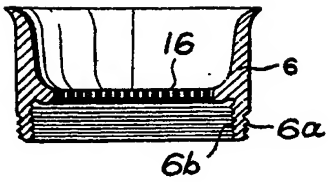
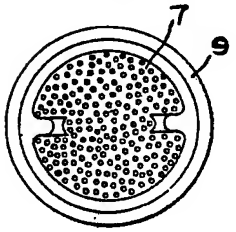


FIG. 3

FIG. 5



1435554 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 3

FIG. 6

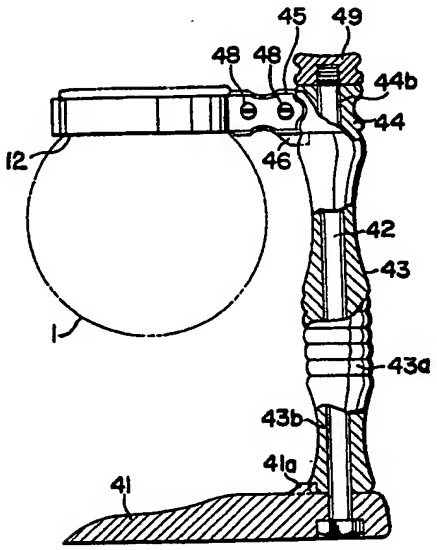


FIG. 4

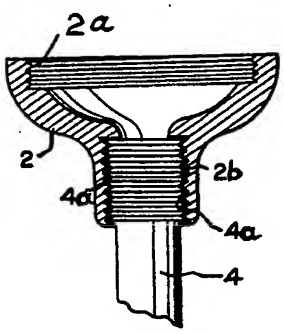


FIG. 7

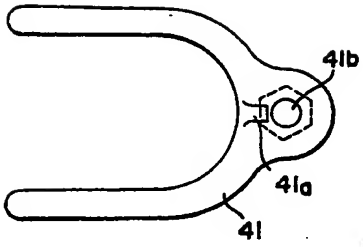


FIG. 8